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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,167	01/24/2005	Shinya Kawachi	SHM-15820	2966

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RANKIN, HILL & CLARK LLP
38210 Glenn Avenue
WILLOUGHBY, OH 44094-7808

EXAMINER	
BEST, ZACHARY P	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/517,167	KAWACHI ET AL.	
	Examiner	Art Unit	
	Zachary Best	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 July 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20091012*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

FUEL CELL SEPARATOR AND METHOD OF MANUFACTURING THE SEPARATOR

Examiner: Z. Best S.N. 10/517,167 Art Unit: 1795

DETAILED ACTION

1. Applicant's amendment filed July 6, 2009 was received. Claim 4 was amended. Claims 1-10 are currently pending examination.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

3. The claim rejection under 35 U.S.C. 103(a) of Claim 1 as being unpatentable over Matsukawa (JP 10-074530 A) in view of Yasumoto et al. (JP 10-261423 A) is maintained.

Regarding Claim 1, Matsukawa teach a fuel cell separator having a central part (20) and an outer peripheral part (2), wherein multiple gas passages (51) for guiding reaction gases and multiple reaction product passages for guiding a reaction product are provided by the outer peripheral part, the reaction gases being guided from the gas passages to the central part and the reaction product produced at the central part being guided to the reaction product passages (par. 14), wherein the central part comprises a metal member (par. 4), the peripheral part comprises a rubber member (par. 11), and a projecting part (58) surrounding the central part is formed integrally with the rubber member (fig. 3), wherein an inner

portion of the peripheral part overlays the central part, said projecting part being provided by said inner portion of said peripheral part (fig. 3), and an outer portion of the peripheral part extends away from the central part, and the gas passages and reaction product passages are formed through said outer portion (fig. 3), wherein said peripheral part has a first face and a second face opposite said first face (fig. 3), said first face having projecting passage seal parts (58) formed thereon (fig. 3), the projecting seal parts formed along respective edges of the gas passages and the reaction product passages so as to individually surround the gas passages and the reaction product passages (figs. 1 and 3). However, Matsukawa fails to teach said second face having passage recesses formed thereon along respective edges of the gas passages and the reaction product passages so as to individually surround the gas passages and the reaction product passages.

Yasumoto et al. teach a fuel cell separator having a projecting part (16) and a recessed part (15) placed on the sealing part (fig. 6) of the separator, wherein the projecting part presses against the corresponding recess on an adjacent fuel cell separator through gas passages and reaction product passages of an electrolyte membrane (2) so to effectively prevent gas leak (abstract). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the fuel cell separator of Matsukawa having recessed parts on the second face of a first separator in which the projecting parts of the first face of a second separator presses against the corresponding recess on the adjacent first fuel cell separator through gas passages and reaction product

passages of an electrolyte membrane because Yasumoto et al. teach the corresponding pressed projecting parts and recessed parts effectively prevent gas leak.

4. The claim rejections under 35 U.S.C. 103(a) of Claims 2 and 5-6 as being unpatentable over Matsukawa in view of Yasumoto et al., as applied to Claim 1 above, and in further view of Kuroki et al. (7,226,685 B2) are maintained.

Matsukawa in view of Yasumoto et al. teach the fuel cell separator as above. However, Matsukawa in view of Yasumoto et al. fail to teach a support hole through the central part filled by the rubber member.

Kuorki et al. teaches a gasket for a fuel cell wherein a support hole (34) is defined through a central part adjacent to an edge of the central part (fig. 6), the support opening being filled by a rubber member so as to attach the rubber member to the central part (col. 13, lines 46-57). It would be advantageous to add the support hole because it would more firmly attach the peripheral part to the central part (col. 16, lines 1-10). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the fuel cell separator of Matsukawa in view of Yasumoto et al. wherein there is a support hole defined through the central part adjacent to an edge of the central part, the support opening being filled by the rubber member so as to attach the rubber member to the central part because Kuorki et al. teach support hole gives improved security of the peripheral part to the central part. Alternatively, simple substitution of one known element

for another to obtain predictable results would have been obvious to one having ordinary skill in the art. *See KSR v. Teleflex*, 127 S. Ct. 1727, 82 U.S.P.Q.2d 1385 (2007).

Regarding Claims 2 and 6, Matsukawa teach said sealing part is rubber (par. 11) and Kuorki et al. individually teach said rubber member is made of silicone rubber (abstract and col. 4, lines 40-53, respectively). Simple substitution of one known element for another to obtain predictable results would have been obvious to one having ordinary skill in the art. *See KSR v. Teleflex*, 127 S. Ct. 1727, 82 U.S.P.Q.2d 1385 (2007).

5. The claim rejections under 35 U.S.C. 103(a) of Claim 3 as being unpatentable over Matsukawa (JP 10-074530 A) in view of Yasumoto et al. (JP 10-261423 A) and further in view of Styczynski (U.S. Patent No. 6,113,827 A) are maintained.

Regarding Claim 3, Matsukawa and Yasumoto et al. teach the structure of Claim 3 as recited in paragraph 4 above, and Matsukawa further teaches a method for creating the separator (pars. 18-20). Matsukawa do not specifically teach forming the gas passages and the reaction product passages through the liquid silicone rubber that has been guided past the edge part of the central part and fail to teach the step of heating the central part to reactively set the silicone rubber guided to the edge part of the central part.

Styczynski teaches a method if injection molding silicone comprising the steps of injecting silicone rubber into the mold at a temperature such that the rubber will not reactively set (col. 5, lines 40-42) and then heating the mold cavity to a sufficient degree that will set the silicon rubber (col. 5, lines 49-51). Styczynski teaches that it is advantageous to

use this method because it will ensure that the silicone will not prematurely set (col. 5, lines 40-42). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the method of Matsukawa and Yasumoto et al. with the additional steps of injecting silicone rubber into the mold at a temperature such that the rubber will not reactively set and then heating the mold cavity to a sufficient degree that will set the silicon rubber (inherently heating the metal central part as well) because Styczynski teach that it will protect against premature setting of the silicone rubber.

6. Claims 4 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsukawa (JP 10-074530 A) in view of Yasumoto et al. (JP 10-261423 A) and further in view of Styczynski (U.S. Patent No. 6,113,827 A) and Murray et al. (US 5,338,497 A).

Regarding Claims 4 and 10, Matsukawa and Yasumoto et al. teach the structure of Claim 3 as recited in paragraph 4 above, and Matsukawa further teaches a method for creating the separator (pars. 18-20). Matsukawa do not specifically teach forming the gas passages and the reaction product passages through the liquid silicone rubber that has been guided past the edge part of the central part and fail to teach the step of heating the central part to reactively set the silicone rubber guided to the edge part of the central part, and heating the central part of the fuel cell separator without heating the injection-molding mold to reactively set the silicone rubber guided to the edge part of the central part.

Styczynski teaches a method if injection molding silicone comprising the steps of injecting silicone rubber into the mold at a temperature such that the rubber will not

reactively set (col. 5, lines 40-42) and then heating the mold cavity to a sufficient degree that will set the silicon rubber (col. 5, lines 49-51). Styczynski teaches that it is advantageous to use this method because it will ensure that the silicone will not prematurely set (col. 5, lines 40-42).

Murray et al. teaches a method of induction curing resins, applicable to injection molding (col. 4, lines 10-34), wherein an induction heatable material (metal) and a non-induction heatable material (resin) are placed in a mold and the induction heatable material is heated to a temperature to cure the resin without the mold also being thermally heated (col. 2, lines 3-32) in order to have faster process cycle times (col. 2, lines 24-32).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the method of Matsukawa and Yasumoto et al. with the additional steps of injecting silicone rubber into the mold at a temperature such that the rubber will not reactively set and then heating the mold cavity to a sufficient degree that will set the silicon rubber (inherently heating the metal central part as well) because Styczynski teach that it will protect against premature setting of the silicone rubber and wherein the separator is induction heated without the mold being heated because Murray et al. teach there will be faster process cycle times to mold the part.

7. The claim rejections under 35 U.S.C. 103(a) of Claim 5 as being unpatentable over Matsukawa in view of Yasumoto et al., as applied to Claim 1 above, and in further view of Kuroki et al. (7,226,685 B2) are maintained.

Matsukawa and Yasumoto et al. teach the fuel cell separator as recited in paragraph 4 above. However, Matsukawa and Yasumoto et al. fail to teach a support hole through the central part filled by the rubber member.

Kuroki et al. teaches a gasket for a fuel cell wherein a support hole (34) is defined through a central part adjacent to an edge of the central part (fig. 6), the support opening being filled by a rubber member so as to attach the rubber member to the central part (col. 13, lines 46-57). It would be advantageous to add the support hole because it would more firmly attach the peripheral part to the central part (col. 16, lines 1-10). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the fuel cell separator of Matsukawa in view of Yasumoto et al. wherein there is a support hole defined through the central part adjacent to an edge of the central part, the support opening being filled by the rubber member so as to attach the rubber member to the central part because Kuroki et al. teach support hole gives improved security of the peripheral part to the central part. Alternatively, simple substitution of one known element for another to obtain predictable results would have been obvious to one having ordinary skill in the art. *See KSR v. Teleflex*, 127 S. Ct. 1727, 82 U.S.P.Q.2d 1385 (2007).

8. The claim rejections under 35 U.S.C. 103(a) of Claim 7 as being unpatentable over Matsukawa in view of Yasumoto et al. and further in view of Styczynski and Murray et al., as applied to Claim 4, and further in view of Tanemoto et al. (US 6,395,416 B1) are maintained.

Matsukawa, Yasumoto et al., Styczynski, and Murray et al. teach the method as recited in paragraph 7, above. However, Matsukawa, Yasumoto et al., Styczynski, and Murray et al. do not specifically teach forming the gas passages and the reaction product passages through the liquid silicone rubber that has been guided past the edge part of the central part and forming the gas passages and the reaction product passages through the liquid silicone rubber at locations spaced from the central part.

Tanemoto et al. teaches a method of creating a fuel cell separator by injection molding silicone said fuel cell separator having a central part (102) and an outer peripheral part (103), wherein an outer portion of the peripheral part extends away from the central part (fig. 4C), and the gas passages and reaction product passages are formed through said outer portion (101a, 101b, and 101c as seen in fig. 5). Tanemoto et al. further teach the method of creating said outer peripheral part by injection molding means (col. 4, lines 21-33). It would be advantageous to create the structure of Tanemoto et al. because it would improve gas tightness of the fuel cell (col. 3, lines 39-48). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the method for manufacturing the fuel cell separator of Matsukawa, Yasumoto et al., Styczynski, and Murray et al. comprising the additional step of guiding the liquid silicone rubber over and past the edge of the central part such that the silicone rubber extends away from the central part and forming the gas passages and the reaction product passages through the liquid silicone rubber that has been guided past the edge part of the central part

because Tanemoto et al. teach said resultant structure will improve the gas tightness of the fuel cell.

9. The claim rejections under 35 U.S.C. 103(a) of Claims 8 and 9 as being unpatentable over Matsukawa in view of Yasumoto et al. and further in view of Styczynski, as applied to Claim 3 above and Matsukawa in view of Yasumoto et al. and further in view of Styczynski and Murray et al., as applied to Claim 4 above, and further in view of Kuroki et al. (7,226,685 B2).

Regarding Claims 8 and 9, Matsukawa in view of Yasumoto et al. and further in view of Styczynski teach a method for manufacturing a fuel cell separator as recited in paragraph 6, above, and Matsukawa in view of Yasumoto et al. and further in view of Styczynski and Murray et al. teach a method for manufacturing a fuel cell separator as recited in paragraph 7. However, Matsukawa in view of Yasumoto et al. and further in view of Styczynski or Styczynski and Murray et al. fail to teach the step of filling a hole defined through the central part with liquid silicone rubber.

Kuroki et al. teach the method of filling a hole in a central part with liquid rubber for use in a fuel cell, the hole being inwardly adjacent to the edge part of the central part, so as to positively interconnect the central part and the peripheral part (col. 7, lines 58-67). It would be advantageous to add the support hole because it would more firmly attach the peripheral part to the central part (col. 16, lines 1-10). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create

the method of manufacturing a fuel cell separator of Matsukawa in view of Yasumoto et al. and further in view of Styczynski or Styczynski and Murray et al. further comprising the step of filling a hole defined through the central part with liquid silicone rubber, the hole being inwardly adjacent to the edge part of the central part, so as to positively interconnect the central part and the peripheral part because Kuroki et al. teach the support hole positively connected via rubber would more firmly attach the peripheral part to the central part. Alternatively, simple substitution of one known element for another to obtain predictable results would have been obvious to one having ordinary skill in the art. *See KSR v. Teleflex*, 127 S. Ct. 1727, 82 U.S.P.Q.2d 1385 (2007).

Response to Arguments

10. Applicant's arguments filed July 6, 2009 have been fully considered but they are not persuasive.

Applicant argues:

(a) Matsukawa fail to teach a rubber peripheral part having an outer portion that extends away from the central part with gas passages and reaction product passages formed solely through the outer portion of the peripheral part;

(b) Murray et al. does not teach or suggest the heating of a metal central portion.

In response to Applicant's arguments:

(a) Applicant reads the claim language too narrowly with the inclusion of "solely" in its argument. Examiner notes that the "comprising" language is used, which means that said passages may be formed through said outer portion (required) and other structures (optional). Therefore, the claim language does not disclude the central part from also forming said passages. Regarding the "extends away" claim limitation, it is Examiner's opinion that very little structure is created from the very relative term. As long as the peripheral part extends away from the central part *in some direction* and said passage is formed in that extension the claim limitation will be met by the prior art. In Matsukawa, figure 3 shows such that claimed structure, among other places, where the line from "51" ends.

(b) Murray et al. clearly suggests a "metal central part substantially made of metal" and a resin material (col. 6, line 67 – col. 7, line 3, see also "sandwich" in col. 9, lines 10-18 and col. 5, lines 8-59), such as a silicon resin (col. 11, line 24), with applicable teachings to the other cited prior arts. It is Examiner's position that one skilled in the art would clearly have motivation to apply the teachings of Murray et al. to do method of creating a fuel cell separator.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary Best whose telephone number is (571) 270-3963. The examiner can normally be reached on Monday to Thursday, 7:30 - 5:00 (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Zachary Best/
Examiner, Art Unit 1795

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795